Enumeration and Biological Data on Arctic Char, *Salvelinus Alpinus*, Ikaluit River, Nunavut, 1974-1994

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ABSTRACT

Read, C. J. 2003. Enumeration and biological data on Arctic char, *Salvelinus alpinus*, Ikaluit River, Nunavut, 1974-1994. Can. Data Rep. Fish. Aquat. Sci. 1117: v + 33 p.

In the early 1980s, the community of Pond Inlet, Nunavut, expressed to Fisheries and Oceans Canada (DFO) their concerns regarding the local fishers' observations that the number and size of fish in their local fisheries were declining. In order to address these concerns, DFO initiated a multi-year program to assess the status of Arctic char utilizing the rivers currently being exploited by the community. Ikaluit River (Tay Sound) was identified as a major fishery, perceived to be in decline. Data on Ikaluit River charr from previous years consisted of biological samples taken from Ikaluit Lake in the fall of 1974, 1982 and 1985. In 1987 and 1988 Arctic char were tagged at the mouth of the Ikaluit River to determine distribution and migration patterns. In 1989 a fish weir was constructed across the river to enumerate the fall upstream run of char into Ikaluit Lake. Biological data were also collected, to provide information on the population parameters of the Ikaluit River anadromous char stock. The fall subsistence/commercial fishery on Ikaluit Lake was monitored and sampled in 1992 and 1993/94. The results of the above mentioned sampling, from 1974 to 1993/94, are presented in this report.

RÉSUMÉ

Read, C. J. 2003. Enumeration and biological data on Arctic char, *Salvelinus alpinus*, Ikaluit River, Nunavut, 1974-1994. Can. Data Rep. Fish. Aquat. Sci. 1117: v + 33 p.

Au début des années 1980, la collectivité de Pond Inlet (Nunavut) a fait part de ses préoccupations au ministère des Pêches et des Océans (MPO) relativement aux baisses du nombre de poissons et de la taille des prises observées par les pêcheurs locaux. Afin de répondre à ces préoccupations, le MPO a lancé un programme pluriannuel d'évaluation des stocks d'omble chevalier dans les rivières où la collectivité pratique la pêche. La pêche dans la rivière Ikaluit (baie Tay) est considérée comme importante, et le stock de cette rivière semblait en déclin. Les données antérieures sur l'omble chevalier de cette rivière avaient été obtenues par analyse d'échantillons biologiques recueillis dans le lac Ikaluit à l'automne en 1974, en 1982 et en 1985. En 1987 et en 1988, des ombles chevaliers ont été marqués à l'embouchure de la rivière Ikaluit afin d'étudier la répartition et les voies de migration du stock. En 1989, une barrière de dénombrement a été construite sur la rivière pour déterminer la remonte automnale de l'omble chevalier vers le lac Ikaluit. Des données biologiques ont également été recueillies pour connaître les caractéristiques du stock anadrome de cette rivière. La pêche commerciale et de subsistance pratiquée à l'automne dans le lac Ikaluit a fait l'objet d'une surveillance, et des prises ont été échantillonnées en 1992 et en 1993. Dans ce rapport, nous présentons les résultats des échantillonnages susmentionnés réalisés entre 1974 et 1994.

INTRODUCTION

Arctic char, *Salvelinus alpinus*, have a circumpolar distribution with the anadromous form occurring in coastal streams throughout its range (Scott and Crossman 1973). Anadromous Arctic char are found in many of the lakes and rivers along the north coast of Baffin Island, including those in the Pond Inlet area (Fig. 1). These fish stocks are important in meeting the nutritional and cultural needs of the local people.

In the early 1980s, the Pond Inlet Hunters and Trappers Organization (HTO) expressed concerns to Fisheries and Oceans Canada (DFO) that there were fewer and smaller fish in several of their traditional fishing areas. In 1986, in response to these concerns, DFO initiated a multi-year program to assess the status of Arctic char utilizing the rivers currently being exploited by the community. Ikaluit River was identified as a major fishery, perceived to be in decline. The only Ikaluit River char data available had been collected by the Department of Sustainable Development (DSD), Government of Nunavut, in the fall of 1974, 1982 and 1985. This data was insufficient to make an assessment of the fishery. Consequently, further studies were initiated.

In 1987 and 1988, char were tagged at the mouth of the Ikaluit River. In November 1987, DFO monitored and collected biological and catch-per-unit-effort (CPUE) data from the Ikaluit Lake subsistence/ commercial fishery. DFO also set gill nets to collect char for further biological sampling.

In 1989, DFO constructed a fish weir across the Ikaluit River to facilitate the enumeratation of the fall upstream run of char into Ikaluit Lake. Biological data were collected to provide information on the population parameters of the Ikaluit River anadromous char stock and tagging was done to determine distribution and migration patterns.

After the 1989 weir study, it became apparent that additional harvest data was important to improve the management of the fishery. To this end, DFO initiated a program, through the HTO, to have local fishers collect biological and CPUE data from the fall subsistence/commercial fisheries of 1992 and 1993/94.

This report includes all of the above mentioned data from 1974 to 1993/4.

STUDY AREA

The Ikaluit River (71° 58'N 79° 15'W) drains into Tay Sound, approximately 90 km southwest of the community of Pond Inlet on Baffin Island, Nunavut (Fig. 1). Ikaluit River is located in the physiographic region known as the Baffin Upland, which is characterized by highly dissected terrain developed on crystalline rocks (Blackdare 1970). The largest of the lakes on the river system, known locally as Ikaluit Lake, has a surface area of approximately 260 ha (Fig. 2).

MATERIALS AND METHODS

Fish Weir Project 1989

A one-way fish weir, with a trap, was constructed in the Ikaluit River, to enumerate and sample the 1989 upstream migration of Arctic char. The weir was located approximately 2.5 km upstream from the mouth of the Ikaluit River (Fig. 2). Construction of the fence was completed on 5 August 1992 and monitored until 28 August 1992.

The weir was constructed in a V-shape to lead the upstream migrant Arctic char into and through the trap. The trap was located at the apex of the fence thus providing a temporary barrier to allow counting and sampling of the fish. The design and construction of the weir were similar to the conduit pipe and metal design described by McGowan (1987). Aluminum angles,

channels and pipes were used in the place of steel ones. The wood and conduit trap used is also described by McGowan (1987).

Morning and evening trap checks were conducted daily with additional checks during the peak of the run, to prevent crowding of fish in the trap. Every fish in the trap was processed; sampled (dead or live), tagged, or simply counted and released upstream of the trap (Table 1). During the earliest part of the upstream run, tagging took precedence over live sampling; however, during the peak of the migration, counting took precedence over any type of sampling in order to avoid crowding and unnatural delays to the migration. On days of heavy migration, instead of being held in the trap to be processed, char were counted as they were allowed to pass through the trap. Additional counting was done as the char passed through openings in the fence, created by lifting 2 or 3 lengths of conduit.

A random sample of char was chosen from the trap by scooping a dip net along the bottom of the trap and then up against one side to the surface. All the char captured in each net dip were sampled. The fish that were tagged were over 400 mm in length. The rest of the fish were live sampled. Together, the tagged and the live sampled fish constitute a random sample .

Fish to be tagged were measured for fork length to the nearest mm and round weight to the nearest 50g. Fish were tagged using a T-bar anchor tag bearing a reference number and a DFO address. Tags were inserted in the left side of the fish at the base of the dorsal fin such that the T-bar was anchored behind the basal pterygiophores.

Tag recapture information was collected from the subsistence and commercial fishers by DSD. For the majority of tag returns the most information received was the tag number and where and when it was caught.

Live sampled fish were measured for fork length and round weight and released upstream of the trap.

A dead sample was also taken, to obtain more detailed biological information. Usually a number of fish were taken each day in an attempt to sample ten fish from each 50 mm length class. In addition to fork length (to nearest mm) and round weight (to nearest 50g), dead sampling consisted of determining the state of maturity and removing otoliths for age determination.

Subsistence/Commercial Fishery Sampling

The 1974, 1982 and 1985 biological samples were collected by DSD. All samples were collected during the fall subsistence/commercial fishery (November and December). The samples from 1974 and 1985 were collected from 127 mm mesh gill nets. The 1982 sample was taken from various mesh sizes from 102 mm to 139 mm. Fork length, round weight and gender were recorded for all the samples. Otoliths for age determination were collected from the 1974 and 1982 samples.

Arctic char captured in gill nets were tagged at the Ikaluit River in 1987 and 1988. In addition, five char were tagged in 1988 in northwestern Tay Sound, approximately 10 km from the Ikaluit River.

In 1987, at the request of DSD and the Pond Inlet HTO, DFO monitored the fall subsistence/commercial fishery at Ikaluit Lake. A total of 358 char were sampled from 89 mm, 102 mm, 114 mm, 127 mm, and 139 mm gill nets used in the subsistence/commercial fishery.

In 1992 and 1993/94 the Ikaluit Lake subsistence/commercial fishery was monitored by the Pond Inlet HTO. Char from the fishers' nets were sampled for fork length, round weight and gender. In 1992 the samples were taken from 102 mm, 114 mm, 127 mm and 139 mm gill nets. Otoliths

for age determination were taken from the char caught in 139 mm nets. In 1993/94 the samples (lengths, weights and gender) were taken from 114 mm and 139 mm gill nets. No otolith samples were taken in 1993/94.

CPUE data was collected from the subsistence/commercial fisheries in 1987 and 1992. The CPUE is expressed as the number of fish caught in 91.44 m (100 yds) of gill net set for 24 hours.

Read (2000) reported biological data and CPUE from Ikaluit Lake for February and November 1996 and November 1997.

DFO Test Netting

At the same time that DFO was monitoring the fall subsistence/commercial fishery at Ikaluit Lake in 1987 they set 89 mm and 127 mm gill nets and sampled 100 char for fork length, round weight, gender and otoliths.

In late August 1990, gill nets were set in the two lakes just north of the mouth of the Ikaluit River (Fig. 2). A small tributary connects these lakes to the Ikaluit River. Twenty-three meters of 127 mm mesh gill net were set in the smaller of the two lakes. Forty-six meters of net were set in the second lake for one hour. The tributary between these two lakes and the Ikaluit River appeared to be passable. Fish would also be able to migrate between the lakes via a connecting stream.

Age Determination

Otoliths were used for determining the age of char. Age determination prior to and including 1989 was done according to Grainger (1953). Age determination for the years after 1989 was conducted according to Nordeng (1961). Therefore, in this report the ages for the years before 1990 were reduced by one year to be comparable with those in the later samples (after 1989).

Data Analysis

The Statistical Analysis System (1999) was used to generate statistics and tabular summaries of length, weight, age, gender and maturity data.

Fulton's condition factor (K) , a measure of the plumpness of the fish, was calculated using the following equation:

$$K = \frac{W \times 10^5}{L^3}$$

where: W = weight (g)
L = length (mm)

RESULTS

Fish Weir Project 1989

A total of 282,564 Arctic char were counted passing upstream through the Ikaluit River weir from 6-27 August 1989 (Fig. 3). Of these 282,564 char, 758 (0.3%) were tagged and released; 1857 (0.7%) were live sampled and released; 175 (0.1%) were dead sampled; and the rest were counted and released (Table 1). The peak of the upstream migration occurred between 16-25 August when approximately 96% of the fish passed through the trap. The day of peak migration occurred on 23 August when 45,612 fish (16.1%) were counted (Fig. 3). Larger fish (>450 mm) made up the majority of the run from 6-16 August when the modal length interval ranged from 450-499 mm to 550-599 mm (Table 1). From 16 August to the end of the monitoring (27 August) the daily modal length interval varied from 250-299 mm on 18 and 23 August to 500-549 mm on 21 August and 450-499 mm on 26 and 27 August.

The modal length interval of the random sample (live sample and tags) from the Ikaluit River upstream migration was 450-499 mm (Fig. 4). The range in length intervals was from 150-199 mm to 700-749 mm (Table 2).

Dead samples were stratified by length over the duration of the fence operation in order to obtain ages representing all length intervals (Tables 3 and 4). The range of ages was 5-14 yr for females and 3-17 yr for males (Table 4). The age of first migration to the sea (the youngest age in the upstream migration) was 3 yr and the oldest fish sampled for age was 17 yr.

In 1989 the mean K value was 1.23, indicating an excellent growing year (Table 2). Female char had a slightly lower K value than males (1.15 and 1.24, respectively, Table 3).

One hundred and eleven (14.6%) of the 1989 tags were returned (Table 5). Eighty-four of the those tag returns were recaptured within three years. Most of the recaptures (97%) were caught in Ikaluit Lake or Ikaluit River.

Subsistence/Commercial Fishery Sampling

The length and age distributions of the gill net samples from 1974 to 1985 are shown in appendices 2-21. Appendices 6 and 9 show the results of the char sampled from the DFO gill nets (89 mm N= 4, 127 mm N= 97) set in Ikaluit Lake in November 1987 combined with those samples taken from the subsistence/ commercial fishery at the same time. No otoliths were taken. The age frequency tables represent the char taken from the DFO gillnets only (App. 11 and 12).

There was a 23% decrease (635 mm to 491 mm) in the mean length of Arctic char sampled from 127 mm mesh gill nets between 1974 and 1985 (Table 6). The change in mean length between the 1974 and 1987 samples (127 mm mesh) was 6% (635 mm to 597 mm) with a corresponding 20% increase in mean age (14.9 yr to 11.9 yr). The mean length of char decreased in all mesh sizes sampled (except 139 mm) from 1987 to 1992. Both the mean length and the mean age of char sampled from 139 mm mesh gill nets gradually increased from 607 mm in 1987 to 649 mm in 1997 and from 12.6 yr in 1992 to 14.5 yr in 1997 (1996 and 1997 samples from Read 2000).

The CPUE for the subsistence/commercial fishery for 1987 ranged from 16 fish for 89 mm mesh to 194 fish for 102 mm mesh (Table 7). In 1992 both the lowest and the highest CPUE were from 139 mm mesh gillnets (34 and 310 fish respectively, Table 8). Read (2000) reported CPUE for Ikaluit Lake for 1996 and 1997. In 1996 it was 162 fish for 102 mm mesh and 72 fish for 127 mm mesh. In 1997 it was 221 fish for 139 mm mesh. CPUE was not collected in other years.

DFO Test Netting

The results of the 1987 DFO gill net samples are discussed as part of the subsistence/commercial fishery sampling (previous heading).

In August 1990 gillnets set in the smaller of the two lakes north of the mouth of the Ikaluit River yielded four char. Three of the four fish were identified as being spawners by their intense red colour. The two males had very prominent hooked lower jaws which is typical of the spawning male char. A net set in the second lake yielded only one fish; a mature male.

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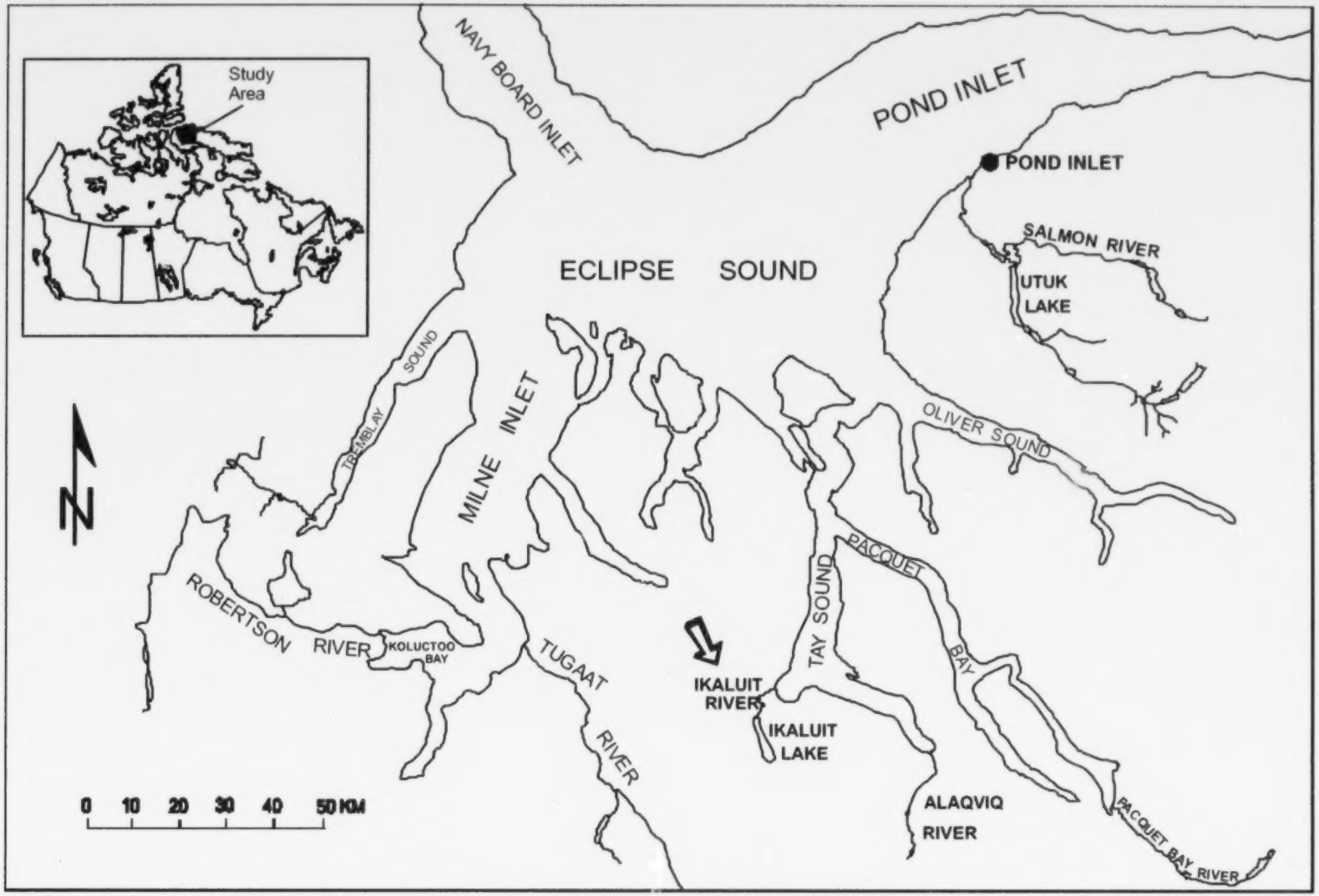

Fig. 1. Map of Pond Inlet area showing Ikaluit River and Lake, and other local fishing areas.

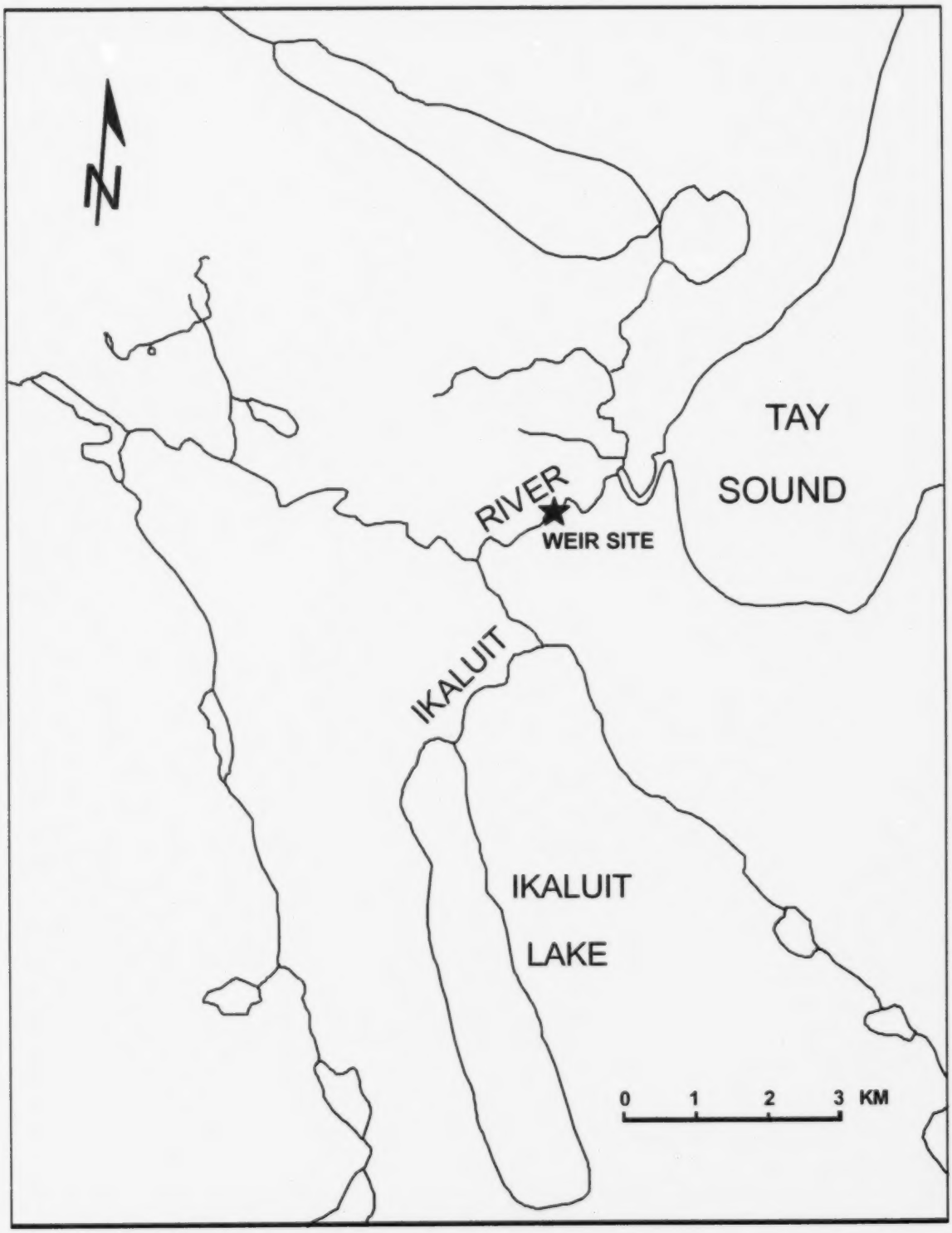

Fig. 2. Map of the Ikaluit River system showing the 1989 weir site.

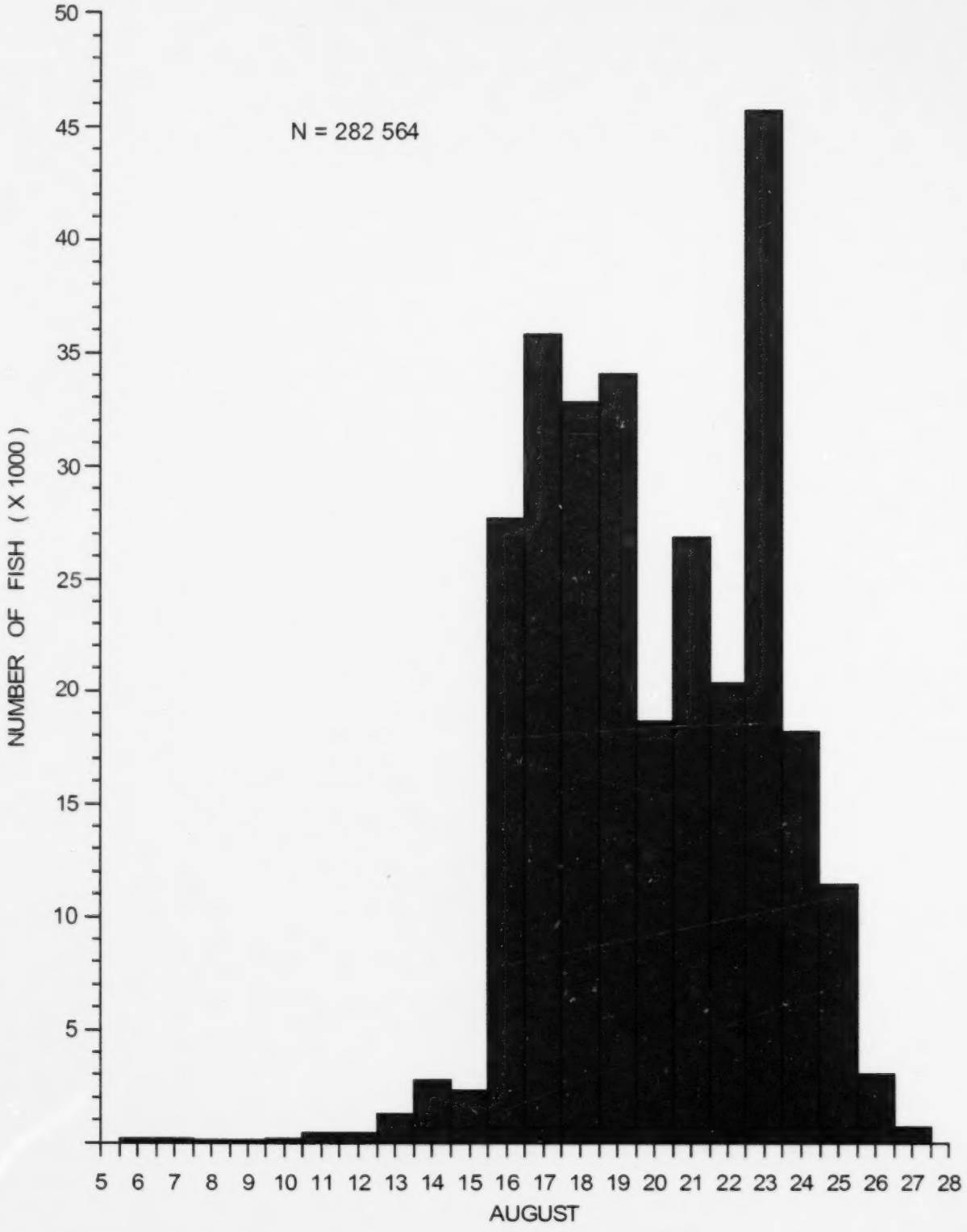

Fig. 3. Daily count of Arctic char migrating upstream through the Ikaluit River weir, August 1989.

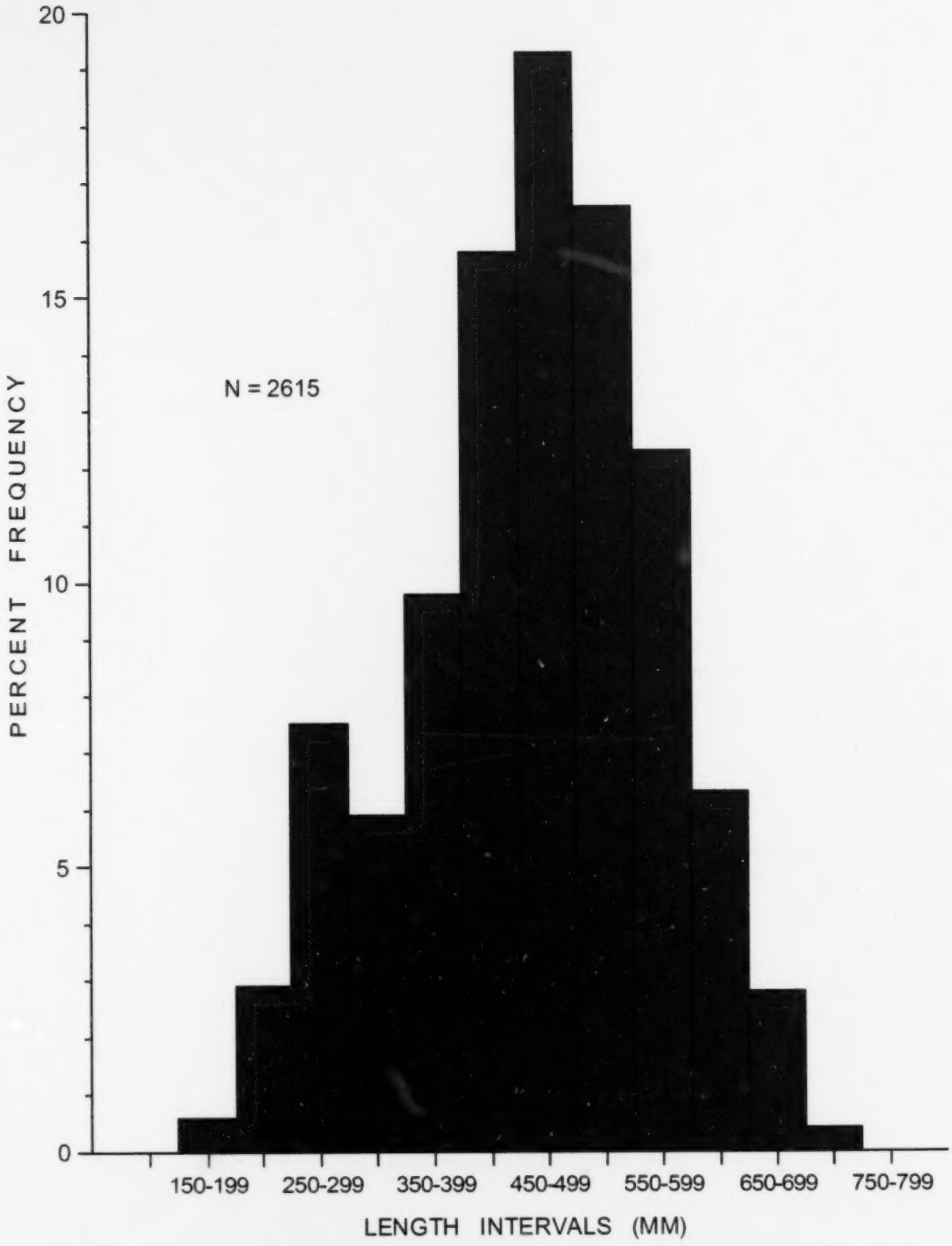

Fig. 4. Length frequency of Arctic char (tag and live samples combined) from the Ikaluit River weir, August 1989.

Table 1. Summary of the number of Arctic char sampled (live and tags), the length-frequency distribution and the daily count at the Ikaluit River weir, August 1989.

August	Daily Count	Number Sampled			Sample Length-Frequency Distribution (mm)											
		Live	Tagged	Total	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	600 - 649	650 - 699	700 - 749
6	174	27	47	74					1	10	19	18	17	5	4	
7	179	36	74	110					1	10	31	38	21	8	1	
8	97	41	39	80				1		6	22	25	17	7	2	
9	118	20	93	113		1			3	17	32	30	21	8	1	
10	172	59	53	112				2	4	13	21	35	23	11	2	1
11	411	70	90	160					1	17	31	39	37	21	14	
12	416	76	89	165					3	11	44	40	38	18	9	2
13	1299	90	100	190			1	3	24	29	55	31	25	17	5	
14	2748	75	74	149		1	3	6	12	27	29	26	23	13	9	
15	2279	74	74	148			1	4	19	21	15	18	26	23	15	6
16	27,604	102	25	127		1	7	12	36	27	13	8	13	4	5	1
17	35,716	112	0	112		8	23	17	23	21	11	4	2	3		
18	32,772	155	0	155	1	31	56	23	15	19	4	4	2			
19	33,993	121	0	121	1	13	14	9	17	24	20	12	5	4	2	
20	18,602	115	0	115	4	4	11	7	12	14	28	13	14	7	1	
21	26,789	64	0	64	4	1		3	3	10	17	21	4	1		
22	20,283	123	0	123	1	5	10	16	21	25	17	20	7	1		
23	45,612	124	0	124	3	9	32	11	17	25	14	8	4	1		
24	18,184	103	0	103		1	9	9	17	26	21	14	5		1	
25	11,413	100	0	100			12	19	8	28	20	6	4	3		
26	3030	116	0	116	1	1	14	8	11	25	28	19	5	3	1	
27	673	54	0	54			4	3	7	8	12	5	8	7		
	282,564	1857	758	2615	15	76	197	153	255	413	504	434	321	165	72	10

Table 2. Biological data by length interval for Arctic char (tag and live) sampled from the Ikaluit River weir, August 1989.

Length Interval (mm)	No.	Percent	Mean Fork Length (mm)	Round Weight (G) Mean	SD	K
150-199	15	1	184	97	30	1.56
200-249	76	3	233	165	60	1.29
250-299	197	8	276	270	63	1.28
300-349	153	6	323	436	91	1.29
350-399	255	10	376	698	137	1.31
400-449	413	16	424	985	171	1.29
450-499	504	19	474	1321	196	1.24
500-549	434	17	523	1806	279	1.26
550-599	321	12	574	2399	327	1.27
600-649	165	6	622	3224	532	1.33
650-699	72	3	667	4120	616	1.39
700-749	10	0	716	4945	824	1.35
Total	2615					
Mean			460	1459	980	1.28

Table 3. Biological data by length interval for Arctic char dead sampled from the Ikaluit River weir, August 1989.

Length Interval (mm)	Males						Females						Total					
		Length(mm)	Weight (g)			%		Length(mm)	Weight (g)			%		Length(mm)	Weight (g)			%
	N	Mean	Mean	SD	K	Mat	N	Mean	Mean	SD	K	Mat	N	Mean	Mean	SD	K	Mat
100-149	5	129	45	11	2.18	0	-	-	-	-	-	-	12	133	48	7	2.07	0
150-199	4	186	63	25	0.98	0	3	197	67	29	0.86	0	10	188	65	25	0.97	0
200-249	8	244	172	45	1.19	13	5	239	150	0	1.10	0	14	239	159	39	1.16	7
250-299	13	267	246	111	1.31	0	9	270	289	117	1.53	11	23	268	259	112	1.37	4
300-349	9	313	339	42	1.10	22	8	319	363	64	1.11	0	18	316	350	51	1.11	11
350-399	4	380	550	71	1.00	50	9	373	594	73	1.15	11	13	375	581	72	1.10	23
400-449	8	411	731	46	1.05	0	8	423	825	151	1.09	38	16	417	778	118	1.07	19
450-499	5	470	1300	497	1.24	60	10	483	1140	196	1.01	80	15	479	1193	318	1.09	73
500-549	4	532	1825	87	1.22	75	7	526	1636	111	1.12	71	11	528	1705	137	1.16	73
550-599	9	581	2167	307	1.11	78	5	564	2060	261	1.14	80	14	575	2129	286	1.12	79
600-649	8	631	3369	270	1.35	100	1	602	2650	-	1.21	0	10	627	3245	356	1.32	80
650-699	10	672	3710	407	1.22	100	1	661	3850	-	1.33	100	11	671	3723	388	1.23	100
700-749	7	713	4886	408	1.35	100	-	-	-	-	-	-	7	713	4886	408	1.35	100
750-799	1	759	4500	-	1.03	100	-	-	-	-	-	-	1	759	4500	-	1.03	100
Total	95						66						175					
Mean		438	1602	1626	1.24			395	880	737	1.15			404	1224	1366	1.23	

Table 4. Biological data by age class for Arctic char dead sampled from the Ikaluit River weir, August 1989.

Age (Yr)	Males							Females							Total						
		Length (mm)		Weight (g)			%		Length (mm)		Weight (g)			%		Length (mm)		Weight (g)			%
	N	Mean	SD	Mean	SD	K	Mat	N	Mean	SD	Mean	SD	K	Mat	N	Mean	SD	Mean	SD	K	Mat
3	3	141	30	50	0	2.07	0	-	-	-	-	-	-	-	6	151	33	58	20	1.86	0
4	3	230	40	167	76	1.34	0	-	-	-	-	-	-	-	6	201	46	117	75	1.37	0
5	7	235	32	150	82	1.04	14	8	256	43	213	122	1.17	0	16	241	43	175	108	1.11	6
6	7	273	28	229	57	1.12	0	4	246	40	163	85	0.98	0	11	263	33	205	72	1.07	0
7	10	296	46	350	170	1.37	0	9	303	27	350	83	1.34	11	21	299	36	340	133	1.32	5
8	9	378	57	622	254	1.09	33	10	366	51	595	138	1.28	10	19	372	53	608	196	1.19	21
9	3	398	15	600	50	0.95	0	7	417	43	829	238	1.11	29	10	411	37	760	225	1.07	20
10	4	472	96	1300	813	1.09	25	1	554	-	1750	-	1.03	0	5	488	91	1390	733	1.08	20
11	4	590	85	2663	1041	1.24	100	3	522	33	1633	465	1.13	100	8	568	70	2300	914	1.20	100
12	13	612	88	3050	1272	1.23	85	9	522	52	1694	484	1.17	67	22	575	87	2495	1216	1.20	77
13	9	591	79	2656	1131	1.26	89	4	525	40	1663	571	1.12	100	13	570	74	2350	1078	1.21	92
14	4	683	31	4175	826	1.30	100	2	484	89	1125	742	0.91	50	6	617	113	3158	1732	1.17	83
15	4	638	41	3288	1050	1.24	100	-	-	-	-	-	-	-	4	638	41	3288	1050	1.24	100
16	2	730	41	4625	177	1.20	100	-	-	-	-	-	-	-	2	730	41	4625	177	1.20	100
17	2	615	46	2600	778	1.10	100	-	-	-	-	-	-	-	2	615	46	2600	778	1.10	100
Total	84							57							151						
Mean		449	180	1642	1593	1.23			390	114	843	661	1.18			413	165	1257	1346	1.21	
Mean Age		9.6							8.8							9.0					

Table 5. Tag and recapture information from Arctic char tagged at Ikaluit River, 1987-89.

Tagged		Recaptured		
Date	Number	Location	Year	Number
Aug-87	72	Ikaluit River/Lake	1987	1
			1990	1
			1995	1
			unknown	1
Aug-88	33	Ikaluit River/Lake	1990	1
		Tay Sound	1991	1
Aug-89	758	Ikaluit River/Lake	1989	34
			1990	24
			1991	14
			1992	12
			1993	4
			1994	2
			1996	1
			1997	1
		Tay Sound	1991	2
			1992	1
			1996	1
			1997	1
		Paquet Bay	1990	1
		Unknown	1990	4
			1991	1
			1992	1
			1993	6
			1996	1

Table 6. Summary of biological data from winter gill net sampling (November to January), Ikaluit Lake, 1974-1997.

Year	Mesh Size (mm)	Fork Length (mm)				Age (yr)				K
		N	Mean	Modal	Range	N	Mean	Modal	Range	
1974	127	100	635	600-649	500-799	78	14.9	15.0	9-22	1.09
1982	102 to 139	69	615	600-649	450-799	48	14.0	13.0	10-22	0.90
1985	127	100	491	450-499	350-749					1.16
1987	89	4	433	400-449	350-499	4	8.8	8.0	8-11	0.94
	102	41	504	500-549	400-699					1.03
	114	135	511	450-549	300-699					1.08
	127	150	597	550-599	450-799	86	11.7	12.0	9-18	1.06
	139	28	607	600-649	400-749					1.08
1992	assorted	717	602	600-649	300-799					0.96
	89	27	557	550-599	400-749					0.96
	102	185	575	550-599	300-799					0.92
	114	36	576	550-599	450-749					0.90
	127	78	541	550-599	400-749					0.86
	139	351	631	600-649	250-849	239	12.6	12.0	9-19	0.96
1993/94	114	152	575	550-599	350-799					0.93
	139	327	657	650-699	400-849					0.93
01/02/1996 *	139	100	654	600-649	450-799	93	14	14.0	9-19	0.98
01/11/1996 *	139	99	645	600-649	550-799	83	14.2	15.0	11-19	1.09
1:97 *	139	104	649	600-649	500-799	91	14.5	15.0	11-19	0.93

* Read, C.J. 2000. Information from Arctic char fisheries in the Baffin Region, Nunavut, 1995 to 1999.

Table 7. Catch-per-unit-effort (CPUE)* from Iqaluit Lake, November 1987.

Mesh Size (mm)	CPUE	Number of Net Sets
89	16	1
102	194	1
114	84	5
127	37	12
139	44	4

* CPUE = the number of fish caught in 91.44 m (100 yd) of gill net set for 24 hours.

Note: Individual fishermen were not identified.

Table 8. Catch-per-unit-effort (CPUE)* from Iqaluit Lake, November 1992.

Fisher	Mesh Size (mm)	CPUE	Number of Net Sets
1	127	119	4
	139	97	2
2	127	190	5
3	139	108	2
4	114	162	2
	139	147	2
5	102	162	8
6	139	310	1
7	89	79	3
8	139	34	2

* CPUE = the number of fish caught in 91.44 m (100 yd) of gill net set for 24 hours.

Note: Individual fishers were identified (each given a number).

App. 1. Biological data by length interval for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, November 1974.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
500-549	2	523	1644	240	1.17	-	-	-	-	-	2	523	1644	240	1.17	-
550-599	10	578	2098	134	1.09	12	581	2174	309	1.10	22	580	2139	243	1.10	55
600-649	20	628	2727	320	1.10	20	618	2612	317	1.11	40	623	2670	320	1.11	50
650-699	22	676	3253	462	1.05	3	657	2986	236	1.06	25	673	3221	447	1.05	12
700-749	9	712	3869	256	1.07	1	730	4537	-	1.17	10	714	3935	321	1.08	10
750-799	1	780	5218	-	1.10	-	-	-	-	-	1	780	5218	-	1.10	-
Total	64					36					100					
Mean		647	2975	730	1.08		612	2551	517	1.10		635	2822	690	1.09	36

App. 2. Biological data by age class for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, November 1974.

Age (Yr)	Males							Females							Total							
			Length (mm)		Weight (g)					Length (mm)		Weight (g)					Length (mm)		Weight (g)			%
	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	Female
9	1	2	690	-	3289	-	1.00	-	-	-	-	-	-	-	1	1	690	-	3289	-	1.00	-
11	2	4	540	42	1928	161	1 23	-	-	-	-	-	-	-	2	3	540	42	1928	161	1.23	-
12	3	6	648	53	2873	721	1.04	4	16	586	5	2098	217	1.04	7	9	613	45	2430	607	1.04	57
13	6	11	634	36	2683	568	1.06	4	16	593	10	2438	286	1.17	10	13	618	35	2585	471	1.11	40
14	12	23	654	41	3119	581	1.11	1	4	560	-	1814	-	1.03	13	17	647	47	3018	664	1.10	8
15	11	21	655	38	2969	507	1.05	6	24	623	23	2754	447	1.14	17	22	644	36	2893	484	1.08	35
16	10	19	654	37	3187	474	1.13	2	8	598	11	2495	321	1.17	12	15	645	40	3071	515	1.14	17
17	3	6	658	64	3213	1E3	1.10	5	20	640	57	2994	927	1.12	8	10	647	56	3076	904	1.11	63
18	1	2	690	-	3515	-	1.07	2	8	603	4	2382	161	1.09	3	4	632	51	2759	664	1.08	67
19	3	6	702	25	3818	286	1.11	1	4	660	-	3062	-	1.07	4	5	691	29	3629	444	1.10	25
22	1	2	780	-	5218	-	1.10	-	-	-	-	-	-	-	1	1	780	-	5218	-	1.10	-
Total	53							25							78							
Mean			654	49	3088	677	1.09			611	36	2571	574	1.12			640	49	2922	686	1.10	32
Mean Age			14.8							15.0							14.9					

App. 3. Biological data by length interval for Arctic char sampled from assorted mesh gill nets (102 mm to 139 mm), Ikaluit Lake, November 1982.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
450-499	-	-	-	-	-	-	-	-	-	-	1	490	1000	-	0.85	-
500-549	1	520	1500	-	1.07	4	538	1250	289	0.80	5	534	1300	274	0.86	80
550-599	6	580	1700	346	0.87	13	573	1746	336	0.93	19	575	1732	330	0.91	68
600-649	15	628	2273	315	0.92	14	621	2136	354	0.89	29	625	2207	336	0.90	48
650-699	8	662	2663	742	0.91	2	660	2700	283	0.94	11	660	2536	768	0.87	20
700-749	2	713	3500	707	0.96	-	-	-	-	-	2	713	3500	707	0.96	-
750-799	2	773	4500	707	0.97	-	-	-	-	-	2	773	4500	707	0.97	-
Total	34					33					69					
Mean		638	2444	827	0.92		595	1909	480	0.90		615	2149	738	0.90	49

App. 4. Biological data by age class for Arctic char sampled from assorted mesh gillnets (102 mm to 139 mm), Ikaluit Lake, November 1982.

Age (Yr)	Males							Females							Total							
			Length (mm)		Weight (g)					Length (mm)		Weight (g)					Length (mm)		Weight (g)			%
	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	Female
10	1	4	645	-	2500	-	0.93	-	-	-	-	-	-	-	1	2	645	-	2500	-	0.93	-
11	1	4	555	-	1500	-	0.88	-	-	-	-	-	-	-	1	2	555	-	1500	-	0.88	-
12	4	17	611	38	2125	629	0.91	2	9	538	18	1450	636	0.92	7	15	573	58	1771	695	0.91	33
13	7	29	672	52	2857	802	0.92	9	41	604	43	2111	521	0.94	17	35	635	55	2365	777	0.90	56
14	3	13	662	29	2800	985	0.95	4	18	606	42	2075	568	0.92	7	15	630	45	2386	797	0.93	57
15	3	13	663	101	3200	2E3	1.05	2	9	573	39	1850	495	0.97	5	10	627	89	2660	1E3	1.02	40
16	3	13	637	53	2833	764	1.08	1	5	620	-	1500	-	0.63	4	8	633	44	2500	913	0.97	25
17	1	4	590	-	2000	-	0.97	3	14	617	23	2000	500	0.86	4	8	610	23	2000	408	0.89	75
18	1	4	650	-	2000	-	0.73	-	-	-	-	-	-	-	1	2	650	-	2000	-	0.73	-
22	-	-	-	-	-	-	-	1	5	615	-	2000	-	0.86	1	2	615	-	2000	-	0.86	-
Total	24							22							48							
Mean			645	56	2625	878	0.95			599	40	1973	503	0.91			621	56	2263	809	0.92	48
Mean Age			13.8							14.4							14.0					

App. 5. Biological data by length interval for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, December 1985.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight (G) Mean	Round Weight (G) SD	K
350-399	2	2	390	725	106	1.22
400-449	16	16	434	972	91	1.19
450-499	40	40	466	1215	177	1.20
500-549	29	29	515	1538	208	1.12
550-599	7	7	561	1850	187	1.05
600-649	4	4	616	2613	256	1.11
650-699	1	1	665	3250	-	1.11
700-749	1	1	720	3900	-	1.04
Total	100					
Mean			491	1408	510	1.16

App. 6. Biological data by length interval for Arctic char sampled from 89 mm mesh gill nets, Ikaluit Lake, November 1987.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
350-399	1	390	600	-	1.01	-	-	-	-	-	1	390	600	-	1.01	-
400-449	2	430	675	35	0.85	-	-	-	-	-	2	430	675	35	0.85	-
450-499	-	-	-	-	-	1	480	1150	-	1.04	1	480	1150	-	1.04	-
Total	3					1					4					
Mean		417	650	50	0.90		480	1150	-	1.04		433	775	253	0.94	25

App. 7. Biological data by length interval for Arctic char sampled from 102 mm mesh gill nets, Ikaluit Lake, November 1987.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
400-449	6	15	435	858	66	1.04
450-499	14	34	476	1118	141	1.03
500-549	15	37	520	1420	144	1.01
550-599	4	10	581	2113	229	1.07
600-649	1	2	610	2250	-	0.99
650-699	1	2	655	2900	-	1.03
Total	41					
Mean			504	1359	462	1.03

App. 8. Biological data by length interval for Arctic char sampled from 114 mm mesh gill nets, Ikaluit Lake, November 1987.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
300-349	1	1	335	400	-	1.06
350-399	2	1	390	975	460	1.64
400-449	11	8	427	873	121	1.13
450-499	45	33	475	1166	181	1.09
500-549	45	33	521	1491	177	1.06
550-599	17	13	564	1853	240	1.03
600-649	11	8	616	2505	314	1.07
650-699	3	2	668	3200	180	1.07
Total	135					
Mean		511	1483	533	1.08	

App. 9. Biological data by length interval for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, November 1987.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
450-499	-	-	-	-	-	1	490	1200	-	1.02	1	490	1200	-	1.02	100
500-549	6	521	1683	324	1.20	2	525	1450	283	1.00	8	522	1625	313	1.15	25
550-599	29	577	2047	253	1.07	18	571	1956	225	1.05	47	575	2012	244	1.06	38
600-649	24	618	2440	228	1.03	5	619	2400	170	1.01	29	618	2433	217	1.03	17
650-699	9	663	3172	465	1.08	1	660	3500	-	1.22	10	663	3205	451	1.10	10
700-749	-	-	-	-	-	1	730	4000	-	1.03	1	730	4000	-	1.03	100
750-799	1	760	4350	-	0.99	-	-	-	-	-	1	760	4350	-	0.99	0
Total	69					28					97					
Mean		600	2332	554	1.07		582	2100	581	1.04		595	2265	568	1.06	29

App. 10. Biological data by length interval for Arctic char sampled from 139 mm mesh gill nets, Ikaluit Lake, November 1987.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
400-449	1	4	445	1150	-	1.31
500-549	2	7	533	1500	0	0.99
550-599	6	21	581	2133	163	1.09
600-649	15	54	619	2563	241	1.08
650-699	2	7	660	3225	460	1.12
700-749	2	7	700	3400	141	0.99
Total	28					
Mean			607	2452	560	1.08

App. 11. Biological data by age class for Arctic char sampled from 89 mm mesh gill nets, Ikaluit Lake, November 1987.

Age	Males							Females							Total							
			Length (mm)		Weight (g)					Length (mm)		Weight (g)					Length (mm)		Weight (g)			%
(Yr)	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	Female
8	3	100	417	25	650	50	0.90	-	-	-	-	-	-	-	3	75	417	25	650	50	0.90	-
11	-	-	-	-	-	-	-	1	100	480	-	1150	-	1.04	1	25	480	-	1150	-	1.04	100
Total	3							1							4							
Mean			417	25	650	50	0.90			480	-	1150	-	1.04			433	38	775	253	0.94	25
Mean Age			8.0							11.0							8.8					

App. 12. Biological data by age class for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, November 1987.

Age	Males							Females							Total							
			Length (mm)		Weight (g)					Length (mm)		Weight (g)					Length (mm)		Weight (g)			%
(Yr)	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	Female
9	2	3	555	7	1800	212	1.05	-	-	-	-	-	-	-	2	2	555	7	1800	212	1.05	-
10	19	30	568	37	2039	441	1.11	3	14	550	52	1800	529	1.06	22	26	566	39	2007	447	1.10	14
11	11	17	600	28	2323	395	1.08	3	14	565	48	1783	486	0.97	14	16	592	34	2207	457	1.06	21
12	20	31	624	42	2533	571	1.03	8	36	575	21	2013	341	1.05	28	33	610	43	2384	563	1.04	29
13	7	11	621	30	2629	731	1.08	4	18	588	30	2088	301	1.03	11	13	609	33	2432	650	1.06	36
14	3	5	660	22	2983	275	1.04	1	5	550	-	1700	-	1.02	4	5	633	58	2663	680	1.03	25
15	1	2	570	-	1850	-	1.00	1	5	570	-	2050	-	1.11	2	2	570	0	1950	141	1.05	50
16	1	2	630	-	2800	-	1.12	1	5	625	-	2450	-	1.00	2	2	628	4	2625	247	1.06	50
18	-	-	-	-	-	-	-	1	5	730	-	4000	-	1.03	1	1	730	-	4000	-	1.03	-
Total	64							22							86							
Mean			601	44	2352	563	1.07			580	46	2064	561	1.03			596	45	2278	573	1.06	26
Mean Age			11.5							12.5							11.7					

App. 13. Biological data by length interval for Arctic char sampled from gill nets of unspecified mesh sizes, Ikaluit Lake, November 1992.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
300-349	2	0	325	225	35	0.65
400-449	13	2	422	727	188	0.97
450-499	35	5	475	1187	465	1.12
500-549	82	11	525	1402	336	0.97
550-599	186	26	572	1818	339	0.97
600-649	216	30	620	2238	290	0.94
650-699	127	18	669	2775	421	0.92
700-749	44	6	715	3423	410	0.94
750-799	12	2	761	4079	434	0.92
Total	717					
Mean			602	2148	736	0.96

App. 14. Biological data by length interval for Arctic char sampled from 89 mm mesh gill nets, Ikaluit Lake, November 1992.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
400-449	3	11	413	733	301	1.01
450-499	3	11	480	1183	153	1.07
500-549	2	7	538	1475	177	0.95
550-599	16	59	579	1806	261	0.93
600-649	1	4	600	2050	-	0.95
650-699	1	4	690	3400	-	1.03
700-749	1	4	730	4000	-	1.03
Total	27					
Mean			557	1743	718	0.96

App. 15. Biological data by length interval for Arctic char sampled from 102 mm mesh gill nets, Ikaluit Lake, November 1992.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight (G) Mean	Round Weight (G) SD	K
300-349	1	1	320	450	-	1.37
350-399	1	1	375	450	-	0.85
400-449	1	1	400	500	-	0.78
450-499	7	4	476	979	104	0.91
500-549	48	26	523	1284	192	0.89
550-599	60	32	567	1656	192	0.91
600-649	47	25	617	2193	305	0.93
650-699	12	6	673	2846	299	0.93
700-749	6	3	713	3483	534	0.96
750-799	2	1	765	4600	71	1.03
Total	185					
Mean			575	1819	690	0.92

App. 16. Biological data by length interval for Arctic char sampled from 114 mm mesh gill nets, Ikaluit Lake, November 1992.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight (G) Mean	Round Weight (G) SD	K
450-499	3	8	487	1000	0	0.87
500-549	5	14	510	1420	526	1.08
550-599	15	42	571	1793	388	0.96
600-649	11	31	616	1859	440	0.79
650-699	1	3	680	1200	-	0.38
700-749	1	3	710	3700	-	1.03
Total	36					
Mean			576	1732	577	0.90

App. 17. Biological data by length interval for Arctic char sampled from 127 mm mesh gill nets, Ikaluit Lake, November 1992.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight(G) Mean	Round Weight(G) SD	K
400-449	2	3	400	600	71	0.94
450-499	21	27	472	840	159	0.80
500-549	19	24	519	1229	126	0.88
550-599	22	28	574	1725	197	0.91
600-649	9	12	614	1928	358	0.83
650-699	3	4	660	2450	589	0.85
700-749	2	3	725	3275	106	0.86
Total	78					
Mean			541	1428	591	0.86

App. 18. Biological data by length interval for Arctic char sampled from 139 mm mesh gill nets, Ikaluit Lake, November 1992.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
250-299	-	-	-	-	-	-	-	-	-	-	1	250	50	-	0.32	-
300-349	-	-	-	-	-	-	-	-	-	-	1	320	350	-	1.07	-
350-399	-	-	-	-	-	-	-	-	-	-	1	350	1150	-	2.68	-
400-449	-	-	-	-	-	-	-	-	-	-	2	435	700	71	0.85	-
450-499	-	-	-	-	-	-	-	-	-	-	16	477	984	276	0.91	-
500-549	1	542	1455	-	0.91	1	535	1740	-	1.14	20	525	1260	222	0.87	50
550-599	10	582	1952	372	1.00	11	581	2006	355	1.02	37	582	1878	321	0.95	52
600-649	78	625	2386	239	0.98	28	618	2338	170	0.99	132	622	2338	259	0.97	26
650-699	64	670	2909	277	0.97	7	665	2794	267	0.95	88	669	2867	339	0.96	10
700-749	37	722	3597	511	0.95	-	-	-	-	-	39	722	3579	508	0.95	-
750-799	11	764	4328	568	0.97	-	-	-	-	-	13	762	4262	542	0.96	-
800-849	-	-	-	-	-	-	-	-	-	-	1	800	4750	-	0.93	-
Total	201					47					351					
Mean		662	2855	689	0.97		615	2316	345	0.99		631	2490	836	0.96	19

App. 19. Biological data by age class for Arctic char sampled from 139 mm gillnets, Ikaluit Lake, November 1992.

Age (Yr)	Males							Females							Total							
			Length (mm)		Weight (g)					Length (mm)		Weight (g)					Length (mm)		Weight (g)			%
	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	N	%	Mean	SD	Mean	SD	K	Female
9	-	-	-	-	-	-	-	1	2	602	-	2310	-	1.06	1	0	602	-	2310	-	1.06	-
10	2	2	624	25	2260	28	0.93	-	-	-	-	-	-	-	5	2	623	51	2200	449	0.90	-
11	15	16	623	41	2415	443	0.99	15	25	622	39	2319	468	0.95	49	21	624	35	2354	410	0.96	50
12	31	34	635	41	2654	624	1.03	19	31	653	40	2735	532	0.97	74	31	645	43	2687	557	0.99	38
13	19	21	673	40	3093	596	1.00	16	26	668	49	3016	658	1.01	57	24	665	48	2904	638	0.98	46
14	16	17	676	50	3100	818	0.99	3	5	716	59	3855	1141	1.03	27	11	678	50	3132	833	0.99	16
15	6	7	706	69	3658	880	1.04	5	8	681	61	3102	1165	0.95	17	7	701	61	3364	933	0.96	45
16	-	-	-	-	-	-	-	2	3	647	30	2388	647	0.87	4	2	642	26	2399	424	0.90	-
17	1	1	753	-	3425	-	0.80	-	-	-	-	-	-	-	2	1	752	2	3525	141	0.83	-
18	1	1	727	-	3055	-	0.80	-	-	-	-	-	-	-	1	0	727	-	3055	-	0.80	-
19	1	1	620	-	2515	-	1.06	-	-	-	-	-	-	-	2	1	649	40	2723	293	1.00	-
Total	92							61							239							
Mean			655	52	2851	711	1.00			653	49	2773	727	0.98			654	50	2761	680	0.97	40
Mean Age			12.7							12.4							12.6					

App. 20. Biological data by length interval for Arctic char sampled from 114 mm mesh gill nets, Ikaluit Lake, December 1993.

Length Interval (mm)	No.	Percent	Mean Fork Length(mm)	Round Weight (G) Mean	Round Weight (G) SD	K
350-399	1	1	380	454	-	0.83
400-449	3	2	430	832	131	1.04
450-499	13	9	482	1048	115	0.93
500-549	34	22	521	1315	166	0.93
550-599	51	34	571	1740	239	0.93
600-649	28	18	622	2229	263	0.92
650-699	12	8	670	2781	276	0.93
700-749	10	7	716	3292	307	0.90
Total	152					
Mean			575	1834	663	0.93

App. 21. Biological data by length interval for Arctic char sampled from 139 mm mesh gill nets, Ikaluit Lake, December 1993 and January 1994.

Length Interval (mm)	Males					Females					Total					
		Length (mm)	Weight (g)				Length (mm)	Weight (g)				Length (mm)	Weight (g)			%
	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	N	Mean	Mean	SD	K	Female
400-449	-	-	-	-	-	-	-	-	-	-	1	430	681	-	0.86	-
450-499	-	-	-	-	-	-	-	-	-	-	1	450	908	-	1.00	-
500-549	-	-	-	-	-	-	-	-	-	-	8	523	1277	169	0.89	-
550-599	4	583	1903	250	0.96	7	583	1851	271	0.93	19	577	1823	233	0.95	64
600-649	51	630	2359	263	0.94	41	630	2369	205	0.95	113	629	2360	239	0.95	45
650-699	82	673	2809	297	0.92	17	663	2686	231	0.92	124	671	2790	295	0.92	18
700-749	39	719	3442	339	0.93	1	710	2955	-	0.83	53	718	3411	325	0.92	3
750-799	5	763	4219	878	0.94	-	-	-	-	-	5	763	4219	878	0.94	-
800-849	3	818	4830	1166	0.88	-	-	-	-	-	3	818	4830	1166	0.88	-
Total	184					66					327					
Mean		674	2870	626	0.93		634	2404	324	0.94		657	2677	640	0.93	26